MOPITT CO and MOZART Forecasts for Flight Planning during INTEX-B

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In support of the INTEX-B field campaign deployments in the spring, 2006, we will provide near-real-time retrievals of MOPITT CO, as well as chemical forecasts using MOZART-4 with the assimilation of MOPITT CO.

We will process the MOPITT data at NCAR in near real-time. Using an expedited data protocol, MOPITT data for the regions of interest will be transferred from NASA and the Level 2 CO retrievals made available within about 9 hours from the measurement time. Operational processing, which depends on the availability of the MODIS cloud mask product, will provide global CO distributions within about 4 days.

Maps of the CO distributions for each day for the regions of interest will be produced along with several day data-composites. MOPITT uses a cross-track scan, and in the absence of persistent cloud cover, the instrument achieves close to global coverage in 3 days. However, a single day's data are often sufficient to identify CO plumes. These maps, along with the corresponding Level 2 data, will be posted to a web-site for easy access by the INTEX team and made available for the campaign archive.

Chemical forecasts from the NCAR global chemical transport model MOZART-4 (Model of Ozone and Related Chemical Tracers, http://gctm.acd.ucar.edu/mozart) will be run and the results made available through our website. A continuous simulation at T42 (2.8°x2.8°), with full chemistry, will include assimilation of the near-real-time MOPITT CO retrievals. Each day, branch forecast tracer runs of approx. 4 days will be run at high resolution (0.5° x 0.625°), including tracers such as Asian industrial and biomass burning, Siberian wildfires and US emissions.
Since biomass burning events have the potential to produce a large perturbation to the climatological CO distribution carried forward in the assimilation, the CO emission inventory will be updated for the forecast runs based on MODIS fire counts. The MODIS Rapid Response products include fire counts for the past 48 hours and 7 days, available through the University of Maryland Web Fire Mapper website (http://maps.geog.umd.edu/maps.asp). These fire count data, along with landcover and vegetation data from satellite will be used in the ACD fire emissions model.

A scientist at NCAR will provide a daily report to accompany the MOPITT product. This will include a preliminary analysis of the data, an identification of sources such as burning events, the larger geographical and temporal context to the CO distributions observed in the region of campaign operations, and a comparison with the corresponding observations from previous years to quickly identify significant perturbations from what would normally be expected. This analysis will make use of other satellite data as and when available. For example, we have experience in comparing MOPITT CO with

MODIS derived products such as fire counts and aerosol optical depths, and work closely with the teams deriving these products.

An experienced member of the MOPITT science team will be present in the field at the flight operations center during the campaign. This scientist will be responsible for receiving the MOPITT CO maps, data, assimilation forecast and preliminary analysis, and for presenting and explaining this information to the INTEX-B team. They will also have on-hand MOPITT and MOZART processing tools to facilitate further analysis and data exploration. We will also help identify opportunities when Terra overpasses will coincide with aircraft flights, and conditions would allow for good validation comparisons. Preliminary results of these comparisons will be presented as soon as MOPITT retrievals have been performed and in situ data is available.

The MOPITT INTEX-A campaign data website, which will be augmented for INTEX-B, is available at http://www.eos.ucar.edu/mopitt/INTEX/.